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EXAMINER	
GUILL, RUSSELL L	

ART UNIT	PAPER NUMBER
2123	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/786,315	IWAKURA ET AL.	
	Examiner	Art Unit	
	Russ Guill	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 September 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-38* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is in response to an Amendment filed September 7, 2007. No claims were added or canceled. Claims 1 - 38 are pending. Claims 1 - 38 have been examined. Claims 1 - 38 have been rejected.

2. The Examiner would like to thank the Applicant for the well-presented amendment, which was useful in the examination process. The Examiner appreciates the effort to carefully analyze the Office Action, and make appropriate arguments and amendments.

Response to Arguments

3. Regarding claims 8 - 10, 24 - 26 and 35 - 37 rejected under 35 USC § 112, second paragraph:

a. Applicant's arguments have been fully considered, but are not persuasive, as follows. Accordingly, the rejections are maintained.

b. The Applicant argues:

i. In the Office Action mailed June 6, 2007, claims 8-10, 24-26 and 35-37 were rejected under 35 U.S.C. § 112, second paragraph. Claims 8, 24 and 35 have been amended responsive to the rejection under 35 U.S.C. § 112. If any additional amendment is necessary to overcome the rejection, the Examiner is requested to contact the Applicant's undersigned representative.

ii. The Examiner respectfully replies:

iii. The claim amendments do not appear to overcome the rejection. While the parent claims of claims 8, 24 and 35 recite elements, the elements do not appear to be mounted on the power supply pair region.

4. Regarding claim 1 rejected under 35 USC § 101:

a. Applicant's arguments have been fully considered, but are not persuasive, as follows. Accordingly, the rejections are maintained.

b. The Applicant argues:

c. In the outstanding Office Action, claims 1-16, 17 and 28-38 were rejected under 35 U.S.C. § 101, as allegedly being directed to non-statutory subject matter. In making this rejection, the outstanding Office Action asserted that independent claims 1, 17, 28 and 38, and claims dependent thereon, are directed to non-statutory subject matter. The Applicants hereby traverse this rejection, as follows.

d. Section 2106 II A of the MPEP states: the claimed invention as a whole must be useful and accomplish a practical application. That is, it must produce a "useful, concrete and tangible result." State Street, 149 F.3d at *>1373-74<, 47 USPQ2d at 1601-02. The purpose of this requirement is to limit patent protection to inventions that possess a certain level of "real world" value, as opposed to subject matter that represents nothing more than an idea or concept, or is simply a starting point for future investigation or research (Brenner v. Manson, 383 U.S. 519, 528-36, 148 USPQ 689, 693-96 (1966); In re Fisher, 421 F.3d 1365, 76 USPQ2d 1225 (Fed. Cir. 2005); In re Ziegler, 992 F.2d 1197, 1200-03, 26 USPQ2d 1600, 1603-06 (Fed. Cir. 1993)).

e. Section IV C 2 (2) of the MPEP states: USPTO personnel shall review the claim to determine it produces a useful, tangible, and concrete result. In making this determination, the focus is not on whether the steps taken to achieve a particular result are useful, tangible, and concrete, but rather on whether the final result achieved by the claimed invention is "useful, tangible, and concrete."

f. Claim 1 is directed to a power supply noise analysis model generator adapted to model power supply layers in a circuit board, and produces the useful, concrete and tangible result of generating "a power supply noise analysis model." Thus, according to Section IV C 2 (2) of the MPEP, claim 17 is directed to statutory subject matter. For at least this reason, the Applicants submit that claim 1 is directed to statutory subject matter.

i. The Examiner respectfully replies:

ii. While the amended claim 1 now appears to have a tangible result, the claim is rejected because the limitations appear to allow an interpretation of the power supply noise analysis model generator that is entirely software, and is therefore non-statutory.

5. Regarding claim 17 rejected under 35 USC § 101:

a. Applicant's arguments have been fully considered, and are persuasive.

b. The Applicant argues:

c. Claim 17 is a method claim and recites a process of modeling power supply layers in a circuit board.

d. Section 101 of the United States Code states: Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefore... (emphasis added).

e. Thus, according to 35 USC § 101, claim 17 is directed to statutory subject matter. Furthermore, claim 17 produces the useful, concrete and tangible result of generating "a power supply noise analysis model." For at least these reasons, the Applicants submit that claim 17 is directed to statutory subject matter.

6. Regarding claims 28 and 38 rejected under 35 USC § 101:

a. Applicant's arguments have been fully considered, but are not persuasive, as follows. Accordingly, the rejections are maintained.

b. The Applicant argues:

c. Each of claims 28 and 38 is directed to a program stored on a computer readable medium for making a computer perform certain steps, which has been deemed to be statutory subject matter, as noted below.

d. Section 2106.01 1 of the MPEP states: ...a claimed computer-readable medium encoded with a data structure defines structural and functional interrelationships between the data structure and the computer software and hardware components which permit the data structure's functionality to be realized, and is thus statutory.

e. Moreover, each of claims 28 and 38 produces the useful, concrete and tangible result of generating "a power supply noise analysis model." For at least these reasons, the Applicants submit that claims 28 and 38 are directed to statutory subject matter.

i. The Examiner respectfully replies:

ii. The claims still allow the interpretation that the program is source code, which is non-functional descriptive material, and is therefore non-statutory. It appears that the claim would be made statutory by claiming a computer readable medium on which are recorded executable instructions which when executed by a computer perform the recited steps. Regarding claim 29, the last limitation connects pattern data to generate a power supply noise analysis model (i.e., an intended use), but does not appear to actually perform a step of actually generating the model.

7. Regarding claim 16 rejected under 35 USC § 101:

a. Applicant's arguments have been fully considered, and are persuasive.

b. The Applicant argues:

c. Although no specific reason was asserted in the outstanding Office Action for the 35 USC § 101 rejection of claim 16, the Applicants further submit that claim 16 is directed to a power supply noise analysis model generator which models a power supply layer in a circuit board, and produces the useful, concrete and tangible result of generating "a power supply noise analysis model." For at least this reason, the Applicants submit that claim 16 is directed to statutory subject matter.

8. Regarding claim 1, 16, 17, 27, 28 and 38 rejected under 35 USC § 103:

a. Applicant's arguments have been fully considered, but are not persuasive, as follows.

b. The Applicant argues:

c. Claims 1-7, 13-14, 16-23, 27-34 and 38 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Jong-Kwan Yook et al., "Computation of Switching Noise in Printed Circuit Boards", 1997, IEEE Transactions on Components, Packaging and Manufacturing Technology, Part A, Volume 20, Number 1, March 1997 (hereinafter, "Yook") in view of Harada, U.S. Patent No. 6,557,154 (hereinafter, "Harada"). Claims 810, 24-26, 35-37 and 15 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Yook as modified by Harada as applied to claims 1-7, 13-14, 16-23, 27-34 and 38 above, and further in view of Hao Shi et al., "Modeling Multilayered PCB Power-Bus Designs Using an MPIE Based Circuit Extraction Technique", August 1998, IEEE International Symposium on Electromagnetic Compatibility, pages 647-651 (hereinafter, "Shi"). Claims 11-12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Yook as modified by Harada as applied to claims 1-7, 13-14, 16-23, 27-34 and 38 above, further in view of Papadopoulou, U.S. Patent No. 6,178,539. It is noted that claims 1, 8, 16, 17, 24, 27, 28, 35 and 38 have been amended. To the extent that the rejections remain applicable to the claims currently pending, the Applicants hereby traverse the rejections, as follows.

d. In the Applicants' invention as recited in independent claims 1 and 16, a power supply pair extraction processing section extracts, as power supply pairs, all of any two different power supply layers that overlap each other in a plan view from a top side of the circuit board, the overlap being determined from CAD data or data indicative of the circuit board and a power supply noise analysis model generation processing section uses the power supply pairs extracted to generate a power supply noise analysis model.

e. The Applicants' invention as recited in independent claims 17, 27, 28 and 38, as amended, includes a step of determining, via CAD data or data indicative of the circuit board, all power supply island patterns existing in two different layers, respectively, that overlap each other in plan view from a top side of the circuit board, and a step of

extracting all power supply island pairs determined to overlap each other in plan view from a top side of the circuit board as power supply island pairs.

f. The Applicants submit that none of Yook, Harada, Shi and Papadopoulou discloses or suggests each and every feature recited in independent claims 1, 16, 17, 27, 28 and 38, as amended.

i. The Examiner respectfully replies:

ii. Applicant's arguments appear to be a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references.

g. The Applicant argues:

h. For at least this reason, the Applicants submit that independent claims 1, 16, 17, 27, 28 and 38, as amended, are allowable over the applied art of record. As claims 1, 16, 17, 27, 28 and 38, as amended, are allowable, the Applicant submits that claims 2-15. 18-26 and 29-37, which depend from allowable claims 1, 17 and 28, respectively, are likewise allowable for at least the reasons set forth above with respect to claims 1, 17 and 28.

i. The Examiner respectfully replies:

ii. Since the rejections of the independent claims were maintained, the rejections of the dependent claims are also maintained for the same reasons.

Claim Rejections - 35 USC § 112

9. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

a. Claims 1 - 15 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

i. Regarding claim 1 and dependent claims, claim 1 recites, "a power supply noise analysis model supplied to a user physically or electronically by said power supply noise analysis model generator". The specification does not appear to disclose that the power supply noise analysis model is supplied to a user physically or electronically by said power supply noise analysis model generator.

10. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

a. Claims 8 - 10, 24 - 26 and 35 - 37 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

i. Regarding claims 8, 24 and 35, the claims recite, "said elements mounted on said power supply pair region". The term appears to have insufficient antecedent support. While there is antecedent support for "said elements", the antecedent elements do not appear to be mounted on the said power supply pair region. For the purpose of claim examination, the phrase is interpreted as "said elements". Correction or amendment is required.

ii. **Claims 9 - 10, 25 - 26 and 36 - 37** are rejected based on their dependency on their respective intermediate and parent claims which are rejected under 35 U.S.C. 112, second paragraph.

Claim Rejections - 35 USC § 101

11. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

12. Claims 1 - 16, 28 - 37 and 38 rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

a. Regarding claims 1 and 16 and dependent claims, the claim is directed to a power supply noise analysis model generator. The limitations of the power supply noise analysis model generator appear to allow an interpretation that is entirely software. The processing sections claimed in the limitations appear to be entirely software. Further, the claim does not appear to have a processor that is functionally connected to the processing sections to allow any functionality to be realized.

b. Regarding independent claims 28 and 38, and dependent claims, the claim is directed to a power supply noise analysis model generator program. The preamble allows an interpretation that the program is source code, which is non-functional descriptive material, and is therefore non-statutory. If a claim can be interpreted to include both statutory and non-statutory material, then the claim must be amended to allow only statutory interpretations.

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

15. **Claims 1 - 7, 13 - 14, 16 - 23, 27 - 34 and 38** are rejected under 35 U.S.C. 103(a) as being unpatentable over Yook (Jong-Kwan Yook et al.; "Computation of Switching Noise in Printed Circuit Boards", 1997, IEEE Transactions on Components, Packaging, and Manufacturing Technology, Part A, Volume 20, Number 1, March 1997, pages 64 - 75) in view of Harada (U.S. Patent Number 6,557,154).

a. The art of Yook is directed to computation of switching noise in printed circuit boards (*page 64, Title*).

b. The art of Harada is directed to analysis of the electromagnetic characteristics of a printed circuit board (*Abstract*).

c. The art of Yook and the art of Harada are analogous art because they are both directed to the analysis of electromagnetic characteristics of a printed circuit board.

d. Regarding **claims 1, 17, 28**:

e. Yook appears to teach:

f. a power supply pair extraction processing section that extracts two power supply island patterns as a power supply pair when any two power supply islands existing in two different power supply layers, respectively, overlap each other, the overlap being determined ~~from the CAD data~~ when any two power supply islands overlap each other in plan view from a top side of the circuit board and the patterns of all pairs of overlapping power supply islands are extracted by the power supply pair extraction processing section (*page 68, figure 3, please note the multiple power supply islands extracted from the PCB; and page 67, left-side column, last paragraph, and right-side column, second paragraph that starts with, "For PCB's having . . ."; the limitation would have been obvious in view of the knowledge of the ordinary artisan as described in the references listed in the Conclusion section of this Office Action*);

g. a node layout processing section that positions plural nodes on a power supply pair region which is occupied by each power supply pair on a plane of said circuit board (*page 67, left-side column, section A. Tiling Procedure, first paragraph*);

h. a node region determination processing section that determines node regions surrounding said nodes, respectively (*page 67, left-side column, section A. Tiling Procedure, first paragraph*);

i. an impedance parameter determination processing section that determines impedance parameters expressing relationships between said nodes, respectively (*pages 67 - 69, section B. Equivalent Circuits; and page 66, figure 2*);

j. a power supply layer model generation processing section that connects said nodes to each other using said impedance parameters, to generate a power supply layer model (*page 66, figure 2, PCB Lumped Electrical Ckt Model; page 68, figure 3, circuits displayed in the lower right corner and upper right corner*);

k. a power supply noise analysis model generation processing section that connects said power supply layer model, said lead pattern data and said via pattern data to one another to generate a power supply noise analysis model supplied to a user physically or electronically by said power supply noise analysis model generator (*page 66, figure 2, PCB Lumped Electrical Ckt Model; page 68, figure 3, circuits displayed in the lower right corner and upper right corner; page 68, right-side column, section 2) Power/Signal/Ground Tiles, teaches lead pattern data; page 64, right-side column, second paragraph that starts with, "The goal of . . .", "PCB tile models are subsequently combined with models for chip current drivers and package leads to produce an electrical simulation model"; page 67, section A. Tiling Procedure, first paragraph; page 69, section 3) Power/Ground Pin Tiles, first paragraph; page 66, left-side column, last paragraph, first sentence*);

l. Yook does not specifically teach:

m. a CAD data obtaining section that obtains CAD data including information concerning a board shape, pattern shapes, and elements;

n. a CAD data conversion processing section that converts said CAD data into power supply island pattern data, element data, lead pattern data, and via pattern data;

o. ~~the overlap being determined~~ from the CAD data;

p. Harada appears to teach:

q. a CAD data obtaining section that obtains CAD data including information concerning a board shape, pattern shapes, and elements (*figure 34, block labeled "CAD for layout of PCB"; and figure 33; and column 4, lines 6 - 17*);

r. a CAD data conversion processing section that converts said CAD data into power supply island pattern data, element data, lead pattern data, and via pattern data (*figure 34, block labeled "CAD for layout of PCB"; and figure 33; and column 4, lines 6 - 17; since the input information about ICs is used to build a circuit model, it would have been obvious that data conversion is performed that converts CAD data into power*

supply island pattern data, element data, lead pattern data, and via pattern data);

s. the CAD data (*figure 34, block labeled "CAD for layout of PCB"*);

t. The motivation to use the art of Harada with the art of Yook would have been the benefit recited in Harada that the invention is a PCB design method that reduces radiation of electromagnetic waves by optimizing layout of a substrate (*Abstract, first sentence*), which would have been recognized as a benefit by the ordinary artisan.

u. Therefore, as discussed above, it would have been obvious to the ordinary artisan at the time of invention to use the art of Harada with the art of Yook to produce the claimed invention.

v. Regarding **claims 16, 27, 38**:

w. Yook appears to teach:

x. a power supply pair extraction processing section that extracts, as power supply pairs, all of any two different power supply layers that overlapp each other in a plan view from a top side of the circuit board, said overlap being determined from data indicative of said circuit board (*page 68, figure 3, please note the multiple power supply islands extracted from the PCB; and page 67, left-side column, last paragraph, and right-side column, second paragraph that starts with, "For PCB's having . . ."*);

y. a power supply noise analysis model generation processing section that uses said power supply pairs extracted to generate a power supply noise analysis model (*page 66, figure 2, PCB Lumped Electrical Ckt Model; page 68, figure 3, circuits displayed in the lower right corner and upper right corner; page 68, right-side column, section 2) Power/Signal/Ground Tiles, teaches lead pattern data; page 64, right-side column, second paragraph that starts with, "The goal of . . .", "PCB tile models are subsequently combined with models for chip current drivers and package leads to produce an electrical simulation model";*

page 67, section A. Tiling Procedure, first paragraph; page 69, section 3) Power/Ground Pin Tiles, first paragraph; page 66, left-side column, last paragraph, first sentence);

z. Yook does not specifically teach (in ***bold italic underline***):

aa. a power supply pair extraction processing section that extracts, as a power supply pair, different two power supply layers overlapping each other in a layering direction ***from data indicative of said circuit board***;

bb. Harada appears to teach:

cc. data indicative of said circuit board (*figure 34, block labeled "CAD for layout of PCB"; and figure 33; and column 4, lines 6 - 17*);

dd. Therefore, as discussed above, it would have been obvious to the ordinary artisan at the time of invention to use the art of Harada with the art of Yook to produce the claimed invention.

ee. Regarding **claims 2, 18, 29**:

ff. Yook appears to teach:

gg. said impedance parameters are a reactance L, a resistance R, and an interlayer capacitance C (*page 68, figure 3, circuit diagram in the upper right corner with L, C and R elements*).

hh. Regarding **claims 3, 19, 30**:

ii. Yook appears to teach:

jj. wherein if a power supply pair space sandwiched between power supplies of an observed power supply pair is contacted or overlapped by another power supply pair space of any other power supply pair, said power supply pair extraction processing section makes said observed power supply pair and said other power supply pair into a group (*page*

68, figure 3, the models in the lower half of the figure; it would have been obvious to group overlapping planes).

kk. Regarding **claims 4, 20, 31**:

ll. Yook does not specifically teach:

mm. a ripple processing section that positions, on said power supply pair region, ripples which are wave fronts of electromagnetic waves radiated into said power supply pair region from said elements, wherein said node layout processing section positions said nodes, based on pitches of said ripples.

nn. Harada appears to teach:

oo. a ripple processing section that positions, on said power supply pair region, ripples which are wave fronts of electromagnetic waves radiated into said power supply pair region from said elements, wherein said node layout processing section positions said nodes, based on pitches of said ripples (*column 15, lines 34 - 67, and column 16, lines 1 - 67*).

pp. Regarding **claims 5, 21, 32**:

qq. Yook does not specifically teach:

rr. said ripple processing section uses rising or failing times of those of said elements which are mounted on said power supply pair region, maximum operating frequencies of those elements, and areas of said ripples, to calculate intervals between said ripples.

ss. Harada appears to teach:

tt. said ripple processing section uses rising or failing times of those of said elements which are mounted on said power supply pair region, maximum operating frequencies of those elements, and areas of said ripples, to calculate intervals between said ripples (*column 15, lines 34 - 67, and column 16, lines 1 - 67*).

uu. Regarding **claims 6, 22, 33**:

vv. Yook does not specifically teach:

ww. said ripple processing section spreads said ripples into power supply pair regions of power supply pairs which belong to a group.

xx. Harada appears to teach:

yy. said ripple processing section spreads said ripples into power supply pair regions of power supply pairs which belong to a group (*column 15, lines 34 - 67, and column 16, lines 1 - 67*).

zz. Regarding **claim 7, 23, 34**:

aaa. Yook does not specifically teach:

bbb. a ripple display processing section that searches for outline coordinates of said ripples, and displays said ripples with the use of said outline coordinates.

ccc. Harada appears to teach:

ddd. a ripple display processing section that searches for outline coordinates of said ripples, and displays said ripples with the use of said outline coordinates (*figure 23, element 65*).

eee. Regarding **claim 13**:

fff. Yook appears to teach:

ggg. said impedance parameter determination processing section determines a reactance L based on distances between said nodes, and determines an interlayer capacitance C with the use of the areas of said node regions and a distance or distances between power supply layers, and said power supply layer model generation processing section arranges said reactance L and said resistance R between nodes on an upper surface of each power supply pair and between nodes on a lower surface of each power supply pair, and arranges each interlayer capacitance C between such a couple of nodes that are arranged at equal positions respectively on the upper and lower surfaces of said power supply pair (*page 68, figure 3; and page 68, left-side column, equations 6, 7, 8*).

hhh. Yook does not specifically teach (in ***bold underline italic***):

iii. said impedance parameter determination processing section determines a reactance L ***and a resistance R*** based on distances between said nodes, and determines an interlayer capacitance C with the use of the areas of said node regions and a distance or distances between power supply layers, and said power supply layer model generation processing section arranges said reactance L and said resistance R between nodes on an upper surface of each power supply pair and between nodes on a lower surface of each power supply pair, and arranges each interlayer capacitance C between such a couple of nodes that are arranged at equal positions respectively on the upper and lower surfaces of said power supply pair.

jjj. Harada appears to teach:

kkk. said impedance parameter determination processing section determines ***a resistance R*** based on distances between said nodes (*column 18, lines 1 - 14*).

lll. Regarding **claim 14**:

mmm. Yook appears to teach:

nnn. a power supply noise analysis model storage that stores said power supply noise analysis model (*page 66, figure 2; since the method is implemented on a computer, it would have been obvious that the PCB Lumped Electrical Ckt Model was stored in storage*).

16. **Claims 8 - 10, 24 - 26, 35 - 37 and 15** are rejected under 35 U.S.C. 103(a) as being unpatentable over Yook as modified by Harada as applied to claims **1 - 7, 13 - 14, 16 - 23, 27 - 34 and 38** above, and further in view of Shi (Hao Shi et al.; "Modeling Multilayered PCB Power-Bus Designs Using an MPIE Based Circuit Extraction

Technique", August 1998, IEEE International Symposium on Electromagnetic Compatibility, pages 647 - 651).

a. Yook as modified by Harada teaches a power supply noise analysis model, as recited in claims **1 - 7, 13 - 14, 16 - 23, 27 - 34 and 38** above.

b. The art of Shi is directed to generating a SPICE model of a PCB and integrating it with IC device models and PCB trace models (*page 651, section Conclusion*).

c. The art of Shi and the art of Yook as modified by Harada are analogous art because they are both directed to the analysis of electromagnetic characteristics of a printed circuit board.

d. **Regarding claims 8, 24, 35**:

e. Yook as modified by Harada does not specifically teach:

f. a mesh division processing section that divides said power supply pair region with the use of meshes based on a wavelength of one of said elements mounted on said power supply pair region that has the highest operating frequency.

g. Shi appears to teach:

h. a mesh division processing section that divides said power supply pair region with the use of meshes based on a wavelength of one of said elements mounted on said power supply pair region that has the highest operating frequency (*page 647, section III. PCB power-bus analysis using CEMPIE, second paragraph, an upper frequency is used to determine the mesh size*).

i. The motivation to use the art of Shi with the art of Yook as modified by Harada would have been the advantage recited in Shi that the formulation starts from first principles and incorporates the distributed behavior of the planes, yet does not solve the discretized integral equations, rather, extracts an equivalent

circuit model (*page 651, section V. Conclusion*), which would have been recognized as a benefit by the ordinary artisan to save time.

j. Therefore, as discussed above, it would have been obvious to the ordinary artisan at the time of invention to use the art of Shi with the art of Yook as modified by Harada to produce the claimed invention.

k. Regarding **claim 9, 25, 36**:

l. Yook as modified by Harada does not specifically teach:

m. an internal data storage which stores information for every of said meshes into a table on which coordinates on said circuit board correspond to addresses.

n. Shi appears to teach:

o. an internal data storage which stores information for every of said meshes into a table on which coordinates on said circuit board correspond to addresses (*page 648, figure 1, and Table I; since the meshes are implemented on a computer, it would have been obvious that there was an internal data storage which stores information for every of said meshes into a table on which coordinates on said circuit board correspond to addresses*).

p. Regarding **claim 10, 26, 37**:

q. Yook as modified by Harada does not specifically teach:

r. the information for every of said meshes includes at least one of a ripple level which indicates the number of ripples from an element to a corresponding mesh, the presence or absence of a node in said corresponding mesh, and a node region identifier expressing a node region to which said corresponding mesh belongs.

s. Shi appears to teach:

t. the information for every of said meshes includes at least a node region identifier expressing a node region to which said corresponding mesh belongs (*page 648, figure 1 and figure 2; the node regions are*

labeled power-bus and power-island, and it would have been obvious that each node had a node region identifier to identify the node region).

u. Regarding **claim 15**:

v. Yook as modified by Harada does not specifically teach:

w. said power supply noise analysis model generation processing section further generates a total circuit model in which said power supply noise analysis model is connected to said element data, and stores said total circuit model into said power supply noise analysis model storage.

x. Shi appears to teach:

y. said power supply noise analysis model generation processing section further generates a total circuit model in which said power supply noise analysis model is connected to said element data, and stores said total circuit model into said power supply noise analysis model storage (*page 651, section V. Conclusion; since the method is implemented in a computer, it would have been obvious that the model was stored for analysis*).

17. **Claims 11 - 12** are rejected under 35 U.S.C. 103(a) as being unpatentable over Yook as modified by Harada as applied to claims **1 - 7, 13 - 14, 16 - 23, 27 – 34 and 38** above, and further in view of Papadopoulou (U.S. Patent Number 6,178,539).

a. Yook as modified by Harada teaches a power supply noise analysis model, as recited in claims **1 - 7, 13 - 14, 16 - 23, 27 – 34 and 38** above.

b. The art of Papadopoulou is directed to calculating critical areas of circuit layouts using Voronoi diagrams (*Abstract*).

c. The art of Papadopoulou and the art of Yook as modified by Harada are analogous art because they are both contain the art of tiling a circuit (*Papadopoulou, Abstract, Voronoi diagram; Yook, page 66, figure 2, tiling processor*).

d. **Regarding claims 11**:

e. Yook as modified by Harada does not specifically teach:

f. wherein, taking a most adjacent node as the node closest to an observed node within a sector having a predetermined radius about said observed node as the center of said sector, said node region determination processing section searches for adjacent nodes by rotating said sector about said observed node.

g. Papadopoulou appears to teach:

h. wherein, taking a most adjacent node as the node closest to an observed node within a sector having a predetermined radius about said observed node as the center of said sector, said node region determination processing section searches for adjacent nodes by rotating said sector about said observed node (*column 5, lines 19 - 67, column 6, lines 1 - 9; it would have been obvious in computing a Voronoi tessellation to search for adjacent nodes by rotating a sector about an observed node*).

i. **Regarding claim 12**:

j. Yook as modified by Harada does not specifically teach:

k. wherein said node region determination processing section removes a square from said power supply pair region thereby to determine an edge of the node region of said observed node with respect to said most adjacent node, said square having as an edge a perpendicular bisector of a predetermined length between said observed node and said most adjacent node and containing said most adjacent node, so that edges of said node region of said observed node are sequentially determined with respect to all the adjacent nodes, respectively, in the order of

increasing distance from said most adjacent node, finally to determine the node region of said observed node.

l. Papadopoulou appears to teach:

m. wherein said node region determination processing section removes a square from said power supply pair region thereby to determine an edge of the node region of said observed node with respect to said most adjacent node, said square having as an edge a perpendicular bisector of a predetermined length between said observed node and said most adjacent node and containing said most adjacent node, so that edges of said node region of said observed node are sequentially determined with respect to all the adjacent nodes, respectively, in the order of increasing distance from said most adjacent node, finally to determine the node region of said observed node (*column 5, lines 19 - 67, column 6, lines 1 - 9; it would have been obvious in computing a Voronoi tessellation to perform the limitation*).

n. The motivation to use the art of Papdopoulou with the art of Yook as modified by Harada would have been the benefit recited in Papadopoulou that in particularly useful methods, the step of decomposing each region into shapes is preferably included (*column 3, lines 5 - 8*).

o. Therefore, as discussed above, it would have been obvious to the ordinary artisan at the time of invention to use the art of Papdopoulou with the art of Yook as modified by Harada to produce the claimed invention.

18. **Examiner's Note:** Examiner has cited particular columns and line numbers in the references applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings of the art and are applied to specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the Applicant in preparing responses, to fully consider the references in their entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the Examiner. The entire reference is considered to provide disclosure relating to the claimed invention.

Conclusion

19. The prior art made of record but not applied is used to show knowledge of the ordinary artisan:

a. Novak (U.S. Patent Number 7,277,841) teaches a method of modeling power and ground planes.

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Russ Guill whose telephone number is 571-272-7955. The examiner can normally be reached on Monday - Friday 9:30 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Rodriguez can be reached on 571-272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Any inquiry of a general nature or relating to the status of this application should be directed to the TC2100 Group Receptionist: 571-272-2100.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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